SCIENTIFIC COMMITTEE

EIGTH REGULAR SESSION

7-15 August 2012

Busan, Republic of Korea

A proposal to investigate range contraction for tropical tunas in the WCPO

WCPFC-SC8-2012/GN-IP-03

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Summary

In recent years there has been a growing concern from WCPFC coastal states, whose waters lie outside the core equatorial fishery, over declines in the abundance of tropical tunas that occur [often seasonally] in their waters (see Annex 1). These concerns have been echoed in WCPFC meetings and through specific requests to the SPC (from SPC members) and have led some to hypothesize that "range contraction" is occurring.

The purpose of this paper is to recommend to the Scientific Committee that a project on range contraction be added to the current Scientific Committee agreed work plan[1]. The benefits of adding this project to the work plan are:

- it is a research project established directly in response to concerns raised in the SC and the Commission;
- it would provide the basis for researchers to seek funding for this work (most likely from sources outside the WCPFC); and
- it provides a basis for the collaboration amongst members and the sharing of data and other information.

For the SC work plan the following addition is suggested:

Project xx. (High)	**Range contraction of tropical tunas, sharks, and billfish**
• Recognizing that biomass for most WCPO stocks is estimated to be at historical lows and concerns have been raised by non-tropical coastal states about declines in the abundance of tropical tuna species, this project seeks to: o Examine existing data to examine the spatial distribution of tropical tunas and related species is changing through time and with change is abundance; o Develop models that allow the simulation testing of alternative hypotheses about spatial distribution patterns including range contraction; and o Provide advice on the how the preservation of the spatial distribution of tropical species may impact on target and limit reference points	

The aims of this project are also consistent with the Scientific Committee Strategic Research Plan[2] (2012-2016). No specific WCPFC funds are sought for this work at this time.

[1] http://www.wcpfc.int/doc/gn-wp-06/work-programme-scientific-committee
[2] http://www.wcpfc.int/node/600

Annex 1: WCPFC member comments on range contraction

WCPFC SC7 report excerpts[emphasis added]:

*121. In response to an enquiry as to why New Zealand was concerned over the status of their domestic yellowfin fishery, New Zealand indicated that recent data from their domestic recreational and commercial longline fisheries indicates that recent yellowfin catches have declined consistently since 2001 and are at historic lows. New Zealand is concerned that this may be due to potential **range contraction** of the yellowfin stock or due to the high level of regional fishing effort to the north and east of New Zealand.*

*213. The SC noted concerns about the decline of skipjack catches in the northern coastal area around Japan (see SA-IP-12). Furthermore, although in 2010 skipjack catches by the middle-sized Japanese pole and line recovered from 2009 (lowest), the second lowest catch was recorded in 2010. It is suggested that the statement from the SC6 report (reducing skipjack availability to high latitude due to high catches in the equatorial area) should be repeated in the SC7 report. This statement reads "There is concern, yet to be substantiated, that high catches in the equatorial region could result in **range contraction**s of the stock, thus reducing skipjack availability to higher latitudes (e.g. Japan, Australia, and New Zealand) fisheries".*

*224. Catches in 2010 were roughly 1.556 million mt, the second highest recorded and below the record high catch of 1.608 million mt in 2009. Equilibrium yield at the current F is about 1.14 million mt. This is about 76% of the MSY level. The assessment continues to show that the stock is currently only moderately exploited (FCUR/FMSY = 0.37) and fishing mortality levels are sustainable. However, there is concern that high catches in the equatorial region could result in **range contraction**s of the stock, thus reducing skipjack availability to higher latitude (e.g. Japan, Australia, New Zealand, and Hawaii) fisheries.*

*381. Discussion focused on inputs for primary productivity, appropriate spatial scales for modelling and the ability for SEAPODYM to test for **range contraction** in stocks. SEAPODYM uses satellite data as inputs for primary productivity, and the presenter stated that research has shown this to well represent seasonality in primary productivity though he noted that work is ongoing to evaluate the model and its inputs. To optimize the spatial scale used in the model, good agreement was needed in the resolution of the fishing data and the realism of the environment. One method might be to increase the resolution until decreases in biomass stabilize and the presenter suggested this could be tested by using 0.5 degree data.*

*382. The presenter believed SEAPODYM could be used to examine **range contraction** in a fishery by modulating the biomass of the predators and examining whether the biomass of adults contracts into a favourable zone due to fewer predators. Skipjack recruitment in the North Pacific could be set to zero and impacts on fisheries in the tropics could be examined. One of the co-authors highlighted the result of SEAPODYM simulation to examine **range contraction**, which suggested that when fishing mortality is removed from the equatorial region there is an impact upon biomass of skipjack in the sub-tropical area, where there is a possible reproductive area for fish migrating to the temperate waters. The presenter also postulated that **range contraction** might have occurred as a result of the recent contraction of the Kuroshio current creating less favourable conditions in the north and resulting movement of skipjack into its core habitat.*

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*304. Japan expressed its concern regarding the pole and line skipjack fishery in its waters which is diminishing substantially year by year. Although **range contraction** has been suggested as an explanation, Japan believes the stock is being depleted and asked the Commission to take measures in tropical waters to prevent further depletion.*